REMARKS

A certified copy of the parent Taiwanese application will be filed in due course.

Claim 19 has been amended as suggested by the Examiner.

A chemical vapor deposition (CVD) process is a convential method for forming a film on a wafer. It employs chemical reactions by reacting gaseous reactants in the chamber in order to form solid products. However, a CVD process not only deposits a film of solid products on the wafer, but also deposits a film of said products on the interior wall of the inner tube.

There is a substantial temperature difference between the incoming gas and the inner part. At the moment, when the gas arrives, there is a great heat stress acting on the thin film of solid products on the interior wall of the inner part. The solid products of the thin film on the interior wall of the inner part peel off and form particles which contaminate the wafer.

In accordance with the applicants' invention, the gas-feeding pipe includes a gas-feeding pipe, which is partially located inside the gas inlet. Its special structure can control and cause the incoming feeding gases to flow stably in the direction toward the outer part instead of toward the inner part. Hence, the particles adhered to the inner part will not peel off due to the low temperature difference between the incoming gas and the inner part.

According to Shimahara et al., all of their several kinds of gas-feeding pipes are different from the pipes of the present invention. As shown in Figs. 6-11 of Shimahara et al. they fail to teach or even hint at a gas-feeding pipe comprising one or a plurality of

openings facing in the direction toward the outer part. All of Shimahara et al.'s gas-feeding pipes have a plurality of openings facing in the direction toward either the top or the lateral. The Shimahara et al. gas-feeding pipe cannot provide both a stable flow and a relatively low temperature difference. Furthermore, the upward openings of Shimahara et al.'s pipes will likely be jammed by the peeling particles of the solid products.

Attached Fig. 1 and Figs. 2(a) and 2(b), respectively, show the gas flow patterns of the applicants' invention and of the cited Shimahara et al. Patent. Shimahara et al. states that convection of the incoming gas within the space between the inner tube and the outer tube can be restrained, while their gas-feeding pipes are used. The gas flow in the space between the inner tube and the outer tube is stable. (See attached Fig. 2(a)).

However, Shimahara et al. is in error. Their apparatus always has to keep the chamber from receiving contaminated gas and to remove the out flowing gas from the gas-out outlet (see attached Fig. 2(b)). As shown in Fig. 2(b), when Shimahara et al. extracts gas from the gas-out outlet, there should be a turbulent flow of the incoming gas and the reacted gas in the space near the outflowing gas outlet. Furthermore, there is a high temperature difference between the inflowing gas and the inner part. Therefore, it is still easy to cause the film of solid products to peel and form particles. Moreover, the disturbed convection would likely cause the peeling particles to jam the upward opening of the gas-feeding pipe.

On the contrary, the applicants' invention can reduce the contamination sources and does not cause any adverse reaction such as that of the Shimahara et al. system. The applicants' gas-feeding pipe is partially mounted inside the gas inlet for adjusting a feeding gas flowing therein in the direction toward the outer part instead of toward the inner part in order to provide enough time for heating the reaction gas so as to diminish the initial heat stress and to prevent particles adhered to the inner part from peeling off.

Yang et al was cited merely because they described an inner tube and nozzle made of quartz or SiC. Mijashita et al was cited because it mentions flow rates, temperature, and pressure. Respectfully submitted, the fact that a different system may or may not have similar parameters is irrelevant. The fact that Shimahara et al., Yang et al. and Mijashita et al. tried and failed to produce applicants' invention, is evidence that applicants have produced an invention.

There must be a showing in the prior art of an inducement to combine two or more references to support a rejection of an invention. The law is found in In re Rouffett, 47 USPQ (2d) 1453 (CAFC 1998) and Ruiz re A.B. Chance Co., 57 USPQ (2d) 1161 (CAFC 2000).

For the foregoing reasons, it is thought that the application is now in condition for allowance. However, if the Examiner should think otherwise, she is respectfully requested to telephone the undersigned attorney. Any reasonably necessary amendments will be made promptly.

Reconsideration and allowance are requested.

Respectfully submitted,

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IN THE
UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF: Jui-Ping LI et al.	)	Group Art Unit: 1763
CASE: 201056-0052	)	Examiner: K. Moore
SERIAL NO.: 09/546,936	)	COVER SHEET FOR "VERSION WITH MARKINGS TO SHOW CHANGES MADE" IN ACCORDANCE WITH 37 CFR 1.121
FILED ON: April 11, 2000	)	
FOR: APPARATUS FOR FORMING FILM IN SEMICONDUCTOR PROCESS AND METHOD FOR FEEDING GAS INTO THE SAME APPARATUS	)	

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IN THE CLAIMS:

1. (AMENDED) An apparatus for forming a film on a wafer in a semiconductor process comprising:

an inner part for mounting therein said wafer;

an outer part covering said inner part wherein a gas inlet and a gas outlet are formed between said inner part and said outer part; and

a gas-feeding pipe partially mounted inside said gas inlet for adjusting a feeding gas flowing therein in a direction toward said outer part instead of said inner part in order to prevent particles adhered to said inner part from peeling off.

12. (AMENDED) A gas-feeding device for feeding a gas into a film-forming apparatus having an inner part and an outer part to form a film on a wafer mounted in said inner part, the temperature difference between said gas and said inner part being in a ranged[d] from 300 °C to 850 °C, said device comprising:

a gas-feeding pipe partially mounted between said inner part and said outer part for adjusting said gas flowing therein in the direction toward said outer part in order to prevent particles adhered to said inner part from peeling off;

a flow controller connected to said gas-feeding pipe for controlling a flow rate of said gas.

18. (AMENDED) A method for feeding a gas into a film-forming apparatus having an inner part and an outer part to form a film on a wafer mounted in said inner part in a semiconductor process, comprising steps of:

(a) feeding said gas into a space between said outer part and said inner part and in a direction toward said outer part in order to prevent particles adhered to said inner part from peeling off; and

(b) leading said gas into said inner part along a path between said outer part and said inner part.

19. (AMENDED) The method according to claim 18 wherein said semiconductor process is one of chemical vapor deposition process [and] or physical vapor deposition process.